

TAB A

PRIMENE™ 81-R Mixture of highly branched C12 to C14 tertiary alkyl primary amine isomers

DESCRIPTION:

Rohm and Haas PRIMENE 81-R is a primary aliphatic amine in which the amino nitrogen atom is linked to a tertiary carbon. The highly branched alkyl group consists of a mixture of isomers predominately in the C12-14 range.

USED IN:

- Manufacturing of additives for fuels, lubricants, metal working fluids, oil field and refinery process chemicals
- Manufacturing of dyes, pigments, and specialty surfactants
- As a specialty extraction agent and much more

ADVANTAGES:

- Superior solvency and hydrocarbon solubility
- Selective and controlled reactivity
- Exceptional fluidity and viscosity over a broad temperature range
- Excellent thermal stability and oxidation resistance
- Low solubility in water

PROPERTIES:

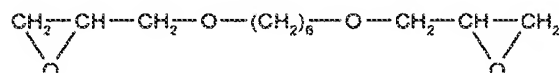
Typical Physical Properties

These properties are typical but do not constitute specifications.

Molecular Weight	185 (Average)
Specific Gravity at 25°C	0.82
Kinematic Viscosity, centistokes	2.9 at 22.8°C 0.9 at 100°C
Base Strength (pKa)	11
Neutral Equivalent	192
Pour Point	<-59°C
Boiling Point	220-240°C
Flash point, PMCC	82°C
Solubility in Water at 25°C	<1000 ppm
Water Solubility in Amine	4% at 22°C
Vapor Pressure	1.6 mm Hg at 20°C
Kp (water/heptane)	0.0036
Auto-ignition Temp (ASTM E 659)	247°C

Grilonit® RV 1812

1,6-Hexane diglycidyl ether



Characteristics

- excellent reactivity at low temperatures
- good solvent resistance
- high mechanical strength
- reduced acid resistance
- used in composites

Product Specifications

Epoxide number	[eq/100g]	0.670 – 0.720
Colour Gardner		0 – 1
Total chlorine	[%]	max. 5.0
Hydrolysable chlorine	[%]	max. 0.2
→ Water	[%]	max. 0.2

Typical Properties

Density at 20°C	[g/cm ³]	1.06
→ Viscosity (Höppler) at 25°C	[mPa*s]	14
Flash point, (Abel-Pensky)	[°C]	149
Vapour pressure at 20°C	[mbar]	< 1.0

EMS-GRILTECH have the capability to produce many other glycidyl ethers and esters. Make use of our expertise.

Recommendations are given in good faith, but are not guaranteed. No liability can be accepted. This also applies to third-party patent rights.

EMS-CHEMIE AG
Business Unit EMS-GRILTECH
Reichenauerstrasse
CH-7013 Domat/Ems
Phone +41 81 632 7202, Fax +41 81 632 7402
www.emsgriltech.com

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Products	Epoxy % solid resin	Epoxy equivalent weight VIAN 305 g/mol		Dynamic viscosity DIN EN ISO 3219			
		Epoxy	Solid resin	mPa.s 23 °C	mPa.s 25 °C	Shear rate s ⁻¹	at % solid resin
BECKOPOX [®] EP 116	100	—	175–185	7800–11000	6000–8000	100	f.o.d.
BECKOPOX EP 117	100	—	175–185	800–1200	700–1000	500	f.o.d.
BECKOPOX EP 128	100	—	190–200	900–1300	700–1000	500	f.o.d.
BECKOPOX EP 140	100	—	180–190	11000–15500	—	25	f.o.d.
BECKOPOX EP 151	100	—	400–500	25000–38000	20000–30000	25 Cylinder	f.o.d.
BECKOPOX VEP 2865	100	—	230–300	1400–2100	1200–1800	100	f.o.d.

^{*)} technical determination

Reactive diluents for epoxy resins

Products	Epoxy % solid resin	Epoxy equivalent weight VIAN 305 g/mol	Dynamic viscosity DIN EN ISO 3219		
			Epoxy	mPa.s 23 °C	at % solid resin
BECKOPOX EP 075	100	320–360	40–70	500	f.o.d.

* BECKOPOX epoxy resins and epoxy hardeners

Properties and use

A/F-liquid resin, non-crystallizing. For highly chemical-resistant coatings, trowelling compounds, adhesives, casting and laminating compounds.

Reactive diluted A/F-liquid resins, non-crystallizing. For chemical-resistant coatings, concrete injections, trowelling compounds, adhesives, casting and laminating compounds.

Reactive diluted A-liquid resin. For chemical-resistant coatings, concrete injections, trowelling, casting, and laminating compounds, hydraulic epoxy mortars (ECC).

A-liquid resin for highly chemical-resistant coatings, adhesives, trowelling, casting and laminating compounds.

Internally plasticized A-liquid resin. Compounding resin for unmodified epoxy resins in coatings, adhesives and casting compounds.

Flexibilized A-liquid resin, extremely low viscous for self-leveling, crack-bridging coatings, flexible even at temperatures far below freezing point. Further applications: adhesives, impact-resistant tools and casting moulds. Preferred hardener: **BECIPOX EH 610**.

Properties and use

Flexibilizing reactive diluent with neutral odour, for unmodified epoxy resins. (polypropylene glycol diglycidyl ether).

Products	T.o.d. % solid matter	H-equivalent weight (g/mol)		Start of gelation 23 °C	Classification	Dynamic viscosity DIN EN ISO 3219		
		Lead	Solid matter			min. 23 °C	Max. 60 °C	Concentration
BECKOPOX® EH 610	100	–	95	5–10 min ¹⁾	C	230–360	500	f.o.d.
BECKOPOX EH 611	100	–	190	5–10 min ¹⁾	C, N	4700–10000	100	f.o.d.

¹⁾ with **BECKOPOX EP 140**, 100 g-batch, 20–23 °C

Epoxy hardeners, adducts

Products	T.o.d. % solid matter no solvent	H-equivalent weight (g/mol)		Start of gelation 23 °C	Classification	Dynamic viscosity DIN EN ISO 3219		
		Lead	Solid matter			min. 23 °C	Max. 60 °C	Concentration
BECKOPOX EH 606	100	–	100	6–7 h ¹⁾	C	3000–4400	100	f.o.d.
BECKOPOX EH 625	100	–	73	20–25 min ¹⁾	C	900–1400	500	f.o.d.
BECKOPOX EH 631	55 XIB	345	190	ca. 5 h ²⁾	Xn	3600–6000	100	f.o.d.
BECKOPOX EH 633	100	–	113	30–40 min ¹⁾	Xn	4700–6000	100	f.o.d.
BECKOPOX EH 637	100	–	100	45–60 min ¹⁾	C	90–120	500	f.o.d.

¹⁾ with **BECKOPOX EP 140**, 100 g-batch, 20–23 °C

²⁾ with **BECKOPOX EP 301/75 X**, 100 g-batch, 20–23 °C

Properties and use

Aliphatic polyamine, preferred use in sealing compounds and adhesives. With **BECKOPOX VEP 2865** for crack-bridging coatings.

Aliphatic polyamine, flexibilized. Preferred use in sealing compounds and adhesives.

Properties and use

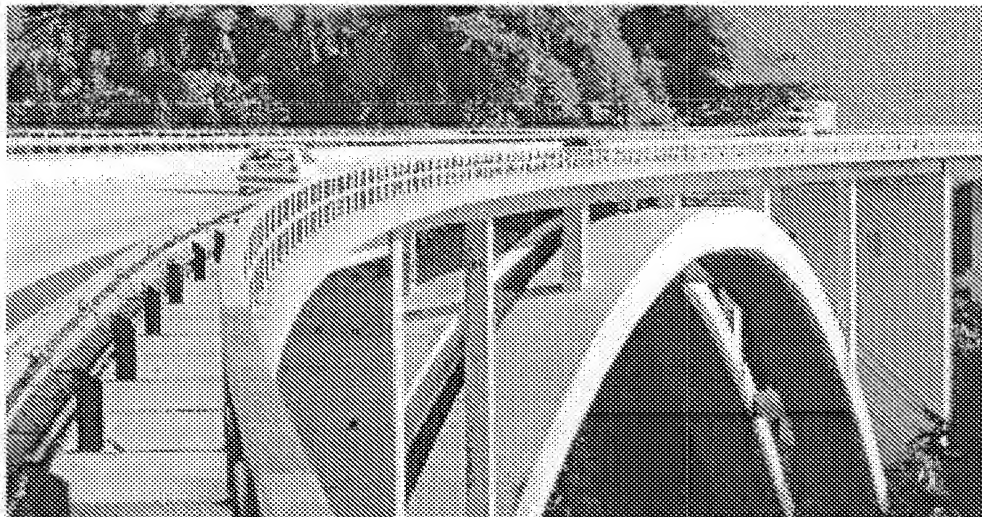
Aliphatic polyamine adduct, systems with very long processing time, plasticizing effect, partner for highly reactive hardeners, very low reaction temperature.

Aliphatic polyamine adduct, free of phenol and phenolic derivates, curing at temperatures as low as 5 °C, good chemical resistance. Coatings, adhesives, laminates.

Aliphatic polyamine adduct, with **BECKOPOX EP 301** for solvent-borne chemical-resistant coatings.

Cycloaliphatic polyamine adduct for relatively yellowing-resistant, chemical-resistant coatings. Preferred for airless (hot) application in thick layers.

Cycloaliphatic polyamine adduct for relatively yellowing-resistant coatings, casting compounds and laminates.



16 Epoxy hardeners, mannich bases

Products	Epoxy % solid matter	H equivalent weight (g/mol)		Start of gelation 23 °C	Classification	Dynamic viscosity DIN EN ISO 3219		
		Epoxy	Solid matter			20–23 °C	25–30 °C	Concentration
BECKOPOX® EH 614	100	–	54	10–20 min ¹⁾	T	3000–5500	100	f.o.d.
BECKOPOX EH 621	100	–	61	15–25 min ¹⁾	T	1700–2300	100	f.o.d.
BECKOPOX EH 624	100	–	80	20–25 min ¹⁾	C	2300–3800	100	f.o.d.
BECKOPOX EH 628	100	–	75	ca. 25 min ¹⁾	C, N	480–720	100	f.o.d.
BECKOPOX EH 629	100	–	70	15–20 min ¹⁾	T	2500–4400	100	f.o.d.

¹⁾ with BECKOPOX EP 140, 100 g-batch, 20–23 °C

Epoxy hardeners, polyamidoamines

Products	Epoxy % solid matter solvent	H equivalent weight (g/mol)		Start of gelation 23 °C	Classification	Dynamic viscosity DIN EN ISO 3219		
		Epoxy	Solid matter			20–23 °C	25–30 °C	Concentration
BECKOPOX EH 651	70 X	255	178	ca. 8 h ¹⁾	Xn	550–1700	500	f.o.d.
BECKOPOX EH 654	100	–	100	2–3 h ²⁾	Xi	17000–25000	25	f.o.d.
BECKOPOX EH 655	100	–	100	1–2 h ²⁾	Xi	1700–3000	100	f.o.d.
BECKOPOX EH 661	100	–	39	60–80 min ²⁾	C	230–360	500	f.o.d.
BECKOPOX EH 663	100	–	49	ca. 90 min ³⁾	C, N	900–1400	500	f.o.d.

¹⁾ with BECKOPOX EP 301/75 X, 100 g-batch, 20–23 °C

²⁾ with BECKOPOX EP 140, 100 g-batch, 20–23 °C

³⁾ with BECKOPOX EP 122 w, 20–23 °C

* BECKOPOX epoxy resins and epoxy hardeners

Properties and use

Mannich base (aliphatic polyamine), curing at temperatures as low as 5 °C. Coatings of high resistance against inorganic acids and organic solvents.

Mannich base (aliphatic polyamine), curing at temperatures as low as 5 °C. Hydrophilic adjusted, especially suited for damp substrates. Coatings, adhesives, concrete injections.

Mannich base (aliphatic polyamine), free-phenol-content < 5 %, curing temperatures as low as 5 °C, good chemical resistance. Coatings, adhesives, laminates. Accelerator for low reactive hardeners.

Mannich base (aliphatic polyamine), contains alkyl phenol. Chemical-resistant coatings on mineral and metallic substrates, epoxy mortars and trowelling compounds.

Mannich base (aliphatic polyamine), curing at temperatures as low as 5 °C, highly chemical-resistant. Coatings, adhesives, laminates, accelerator for low reactive hardeners.

Properties and use

Polyamidoamine, in combination with **BECKOPOX EP 301** for solvent-borne primers and topcoats with long processing time.

Polyamidoamine, in combination with liquid epoxy resins for adhesives, trowelling and casting compounds.

Polyamidoamine, low-viscous. In combination with liquid epoxy resins for adhesives, trowelling and casting compounds, cable-sealing compounds.

Polyamidoamine, modified. For highly filled epoxy mortar or epoxy concrete, adhesives, water washable jointing compounds.

Polyamidoamine, modified. Properties like **BECKOPOX EH 661**, but develops less intensive odour during application.



Epoxy resins

General properties

PRODUCTS	liquid	solid	solvent-free	solvent-containing (w = water)	aqueous emulsion	non-modified	reactive diluent	reactive diluted epoxy resin	plasticizing	water emulsifiable	non crystallizing	crosslinking with isocyanates
BECKOPOX® EP 075	●		●			●	●		●			
BECKOPOX EP 116	●		●			●					●	
BECKOPOX EP 117	●		●					●			●	
BECKOPOX EP 122 w	●		●					●		●	●	
BECKOPOX EP 128	●		●					●				
BECKOPOX EP 140	●		●			●						
BECKOPOX EP 147 w	●		●							●	●	
BECKOPOX EP 151	●		●						●			
BECKOPOX EP 301		●		●		●						●
BECKOPOX EP 304		●	●			●						●
BECKOPOX EP 307		●	●			●						●
BECKOPOX EP 309		●	●			●						●
BECKOPOX EP 384 w				w	●	●				●		
BECKOPOX EP 385 w				w	●				●	●		
BECKOPOX EP 386 w				w	●				●	●		
BECKOPOX VEP 2340 w				w	●					●	●	
BECKOPOX VEP 2381 w				w	●					●	●	
BECKOPOX VEP 2382 w				w	●					●	●	
BECKOPOX VEP 2390 w				●					●	●		
BECKOPOX VEP 2865	●		●						●		●	

*BECKOPOX epoxy resins and epoxy hardeners

Product	solvent-free	solvent-containing (w=water)	short pot life (RT)	medium pot life (RT)	long pot life (RT)	low-temperature curing down to 5 °C	curing under water	water emulsifiable	non-tacky surface in high rel. humidity	plasticizing	good adhesion to metal	good adhesion to moist concrete	relatively good resistance to yellowing	chemical resistance to inorganic acids	chemical resistance to organic acids	chemical resistance to alkaline solutions	chemical resistance to solvents
Polyamines																	
BECKOPOX® EH 606	●				●				●	●	●	●	●			●	
BECKOPOX EH 610	●		●			●				●	●	●	●			●	
BECKOPOX EH 611	●		●			●				●	●	●	●			●	
BECKOPOX EH 613 w	●	w	●			●		●	●		●	●	●			●	
BECKOPOX EH 614	●			●		●					●	●				●	●
BECKOPOX EH 621	●			●		●	●		●		●	●			●	●	●
BECKOPOX EH 623 w	●	w				●		●	●		●	●	●			●	
BECKOPOX EH 624	●			●		●	●		●		●	●			●	●	●
BECKOPOX EH 625	●			●		●			●		●	●	●		●	●	●
BECKOPOX EH 628	●			●		●			●		●	●			●	●	●
BECKOPOX EH 629	●			●		●	●		●		●	●			●	●	●
BECKOPOX EH 631	●	●			●						●	●	●			●	
BECKOPOX EH 633	●			●		●			●		●	●	●		●	●	●
BECKOPOX EH 637	●			●		●			●		●	●	●		●	●	
BECKOPOX EH 2104 w	●	w	●					●	●		●	●	●				
BECKOPOX VEH 2106 w	●	w	●					●	●		●	●	●			●	
BECKOPOX VEH 2177 w	●	w		●				●	●		●	●	●			●	
BECKOPOX VEH 2188 w	●	w		●				●	●	●	●	●	●			●	
BECKOPOX VEH 2849 w	●	w	●					●	●		●	●	●			●	
Polyamidoamines																	
BECKOPOX EH 651	●	●			●				●	●	●					●	
BECKOPOX EH 654	●			●					●	●	●					●	
BECKOPOX EH 655	●			●					●	●	●					●	
BECKOPOX EH 659 w	●	w			●			●	●	●	●	●				●	
BECKOPOX EH 661	●			●				●	●	●	●	●		●		●	
BECKOPOX EH 663	●			●				●	●	●	●	●		●		●	

*BECKOPOX epoxy resins and epoxy hardeners